

570.5
A

GENERAL LIBRARY,
UNIV. OF MICH.,
OCT 19 1911

THE AMERICAN MUSEUM JOURNAL



A SMALL SECTION OF THE BULLFROG GROUP

Volume XI

October, 1911

Number 6

Published monthly from October to May inclusive by

THE AMERICAN MUSEUM OF NATURAL HISTORY

NEW YORK CITY

ONE DOLLAR PER YEAR

FIFTEEN CENTS PER COPY

570

American Museum of Natural History
Seventy-seventh Street and Central Park West, New York City

BOARD OF TRUSTEES

President

HENRY FAIRFIELD OSBORN

First Vice-President

CLEVELAND H. DODGE

Treasurer

CHARLES LANIER

Second Vice-President

J. PIERPONT MORGAN, JR.

Secretary

ARCHER M. HUNTINGTON

THE MAYOR OF THE CITY OF NEW YORK
THE COMPTROLLER OF THE CITY OF NEW YORK
THE PRESIDENT OF THE DEPARTMENT OF PARKS

ALBERT S. BICKMORE
GEORGE S. BOWDOIN
JOSEPH H. CHOATE
THOMAS DEWITT CUYLER
JAMES DOUGLAS
MADISON GRANT
ANSON W. HARD
ADRIAN ISELIN, JR.
ARTHUR CURTISS JAMES
WALTER B. JAMES

A. D. JUILLIARD
GUSTAV E. KISSEL
SETH LOW
OGDEN MILLS
J. PIERPONT MORGAN
PERCY R. PYNE
WILLIAM ROCKEFELLER
JOHN B. TREVOR
FELIX M. WARBURG
GEORGE W. WICKERSHAM

EXECUTIVE OFFICERS

Acting Director

CHARLES H. TOWNSEND

Assistant Secretary

GEORGE H. SHERWOOD

Assistant Treasurer

THE UNITED STATES TRUST COMPANY OF NEW YORK

THE MUSEUM IS OPEN FREE TO THE PUBLIC ON EVERY DAY IN THE YEAR.

THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world. The membership fees are,

Annual Members.....	\$ 10	Fellows.....	\$ 500
Sustaining Members (Annual).....	25	Patrons.....	1000
Life Members.....	100	Benefactors (Gift or bequest)	50,000

THE MUSEUM LIBRARY contains more than 60,000 volumes with a good working collection of publications issued by scientific institutions and societies in this country and abroad. The library is open to the public for reference daily — Sundays and holidays excepted — from 9 A. M. to 5 P. M.

THE MUSEUM PUBLICATIONS are issued in six series: The American Museum Journal, Annual Report, Anthropological Papers, Bulletins, Guide Leaflets and Memoirs. Information concerning their sale may be obtained at the Museum Library.

GUIDES FOR STUDY OF EXHIBITS are provided on request by the Department of Public Education. Teachers wishing to bring classes should write or telephone the Department for an appointment, specifying the collection to be studied. Lectures to classes may also be arranged for. In all cases the best results are obtained with small groups of children.

WORKROOMS AND STORAGE COLLECTIONS may be visited by persons presenting membership tickets. The storage collections are open to all persons desiring to examine specimens for special study. Applications should be made at the information desk.

THE MITLA RESTAURANT in the east basement is reached by the elevator and is open from 12 to 5 on all days except Sundays. Afternoon Tea is served from 2 to 5. The Mitla Room is of unusual interest as an exhibition hall being an exact reproduction of temple ruins at Mitla, Mexico.

The American Museum Journal

CONTENTS FOR OCTOBER, 1911

Frontispiece, The Bullfrog Group

A Note Regarding Human Interest in Museum Exhibits

FREDERIC A. LUCAS 187

A Gift of Peculiar Value.....GEORGE H. SHERWOOD 189

The personal library and a collection of more than 20,000 lantern slides
presented by Professor Albert S. Bickmore

News of the Congo Expedition..... 191

The Making of Pottery at San Ildefonso...HERBERT J. SPINDEN 192

The Amphibians of the Great Coal Swamps.....W. D. MATTHEW 197

Animal life many million years ago in which lay the possibilities of develop-
ment into the intelligent life of to-day

"Revealing and Concealing Coloration in Birds and Mammals," a
book by Theodore Roosevelt..... 200

Exhibition of Reptiles and Amphibians.....BASHFORD DEAN 201

Some Methods and Results in Herpetology

MARY CYNTHIA DICKERSON 203

Museum News Notes..... 213

MARY CYNTHIA DICKERSON, *Editor*

Subscription, One Dollar per year. Fifteen cents per copy

A subscription to the JOURNAL is included in the membership fees of all classes of Members of
the Museum

Subscriptions should be addressed to the AMERICAN MUSEUM JOURNAL, 30 Boylston St.,
Cambridge, Mass., or 77th St. and Central Park West, New York City

Entered as second-class matter January 12, 1907, at the Post-office at Boston, Mass.
Act of Congress, July 16, 1894



186

THE BULLFROG GROUP

A new group installed in the east tower of the second floor, showing some of the activities of the common bullfrog (*Rana catesbeiana*). Southern New England, July.

Transparent background painted by Hobart Nichols and Albert Operti; frogs cast in wax and colored by Dwight Franklin; accessories made by various assistants in the Department of Preparation and Installation; group assembled by Ernest Smith; work planned and supervised by M. C. Dickerson, Assistant Curator of Zoology.

—"Some Methods and Results in Herpetology," page 203

The American Museum Journal

VOL. XI

OCTOBER, 1911

No. 6

A NOTE REGARDING HUMAN INTEREST IN MUSEUM EXHIBITS

By Frederic A. Lucas

IT was a favorite saying of Dr. Goode of the National Museum that in preparing any museum exhibit it was of the utmost importance to keep in mind its human interest — to show, if possible, its direct relation to mankind in general and to the individual observer in particular. Dr. Goode was quite right. We may like to see strange and curious objects, but we like them all the better if there is something about them with which we are slightly familiar; in truth, to find something in a museum exhibit with which we are personally and pleasantly familiar is like recognizing the face of a friendly acquaintance in a strange city.

The purpose of arousing personal human interest is the keynote of the exhibits of the modern museum. The museum of fifty years ago, or even less, was devoted to the exhibition of objects. The task of the modern museum is to display ideas and to teach important facts, and one of the best means to this end is to show something more or less familiar in order to arouse interest and stimulate a desire to know more about the subject.

In the old type of museum a bird was shown as a specimen of a particular species, with no idea of anything beyond. Of course the purpose of mere record still exists, but whenever possible something more is done — the relation of the bird to others is given, its whole life is shown, the manner in which it is or has been influenced by its surroundings, and the part it plays in the general economy of nature and directly toward man.

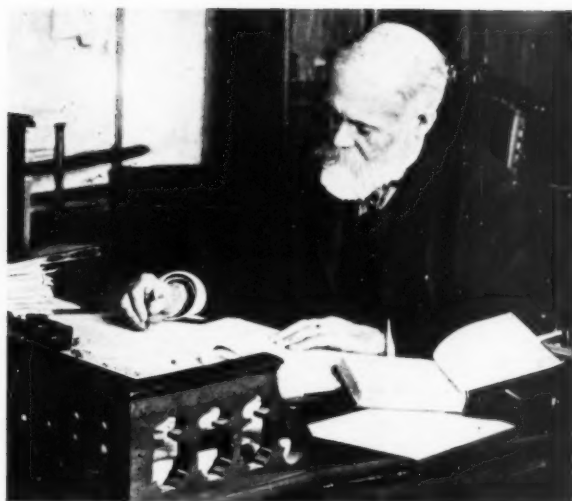
The value of this human interest as an attractive force is shown in the universal attention given to those exhibits in which Man or his works form a part, or in which he is concerned. Examples of this are the series in the United States National Museum where the skeleton of Man is compared with the skeletons of the great apes; or the collection in the Brooklyn Institute Museum, which treats of Man as a member of the order *Primates* and which calls attention to some of the points in which he resembles or differs from other members of the order. This exhibit is extremely popular and on days when the attendance is good is surrounded by visitors whose interest shows that Pope knew whereof he spoke when he wrote that the "proper study of mankind is man."

It is a curious fact that models of scenes illustrating the occupations of savage or little-known races of men apparently arouse greater interest when in miniature, attracting more attention than full-size reproductions. This is true partly because in the small group the whole scene can be grasped at once as in a picture, but especially because of human interest lent the exhibit by the fact that we know some one wrought the entire work — figures, landscape and all. It is this latter that explains in part the interest taken in the Habitat Groups of Birds, which is due not merely to the skillful reproduction of nature but to the fact that it is a reproduction, that waving branches and jagged rocks have been deftly imitated by the hand of man. The admiration of the observer is not entirely for the group; a part goes to the brain that devised it and to the hand that wrought it.

A museum may display pigeons or fowl as examples of variation under domestication, but the average visitor sees them merely as birds with which he has an actual acquaintance and in which he is personally interested. He probably has not the least idea of the origin of our domesticated birds, he has never given the matter a thought, but the chances are that out of many observers a few will have their interest aroused, note the fact that in one case the rock pigeon and in the other the jungle fowl is the original stock from which our multifarious birds have been derived, and come to realize that what man has done rapidly on a small scale, Nature has been doing slowly on a grand scale ever since life originated on this planet of ours. Incidentally he may be led to reflect on the work of Darwin and others in formulating and expounding the theory of evolution. Here are apparent the direct human interest and the manner in which the casual visitor is led by something with which he is acquainted to something which he has never considered.

In other cases the road is not so evident, but there is generally some point of contact between visitor and object. The problem for the museum is to find this point of contact. A foraminifer is a very abstract thing to most people, but a piece of nummulitic limestone, of which the pyramids are built, or a bit of chalk supplies the human interest and puts the visitor in touch, very lightly though it be, with the simpler forms of life, suggesting the part they play in everyday life and the direct concern he may have in these apparently insignificant creatures.

It may be granted that the necessary human touch is not to be found in each and every object in a science museum — as perhaps is likely to be the case in a museum of history or art — or in every part of an exhibit, although it may be present in the exhibit as a whole. The point that the museum bears in mind is, that whenever possible, some link between the facts of the exhibit and the interests and experiences of the observers must be brought forward and emphasized.



A GIFT OF PECULIAR VALUE

PRESENTED BY PROFESSOR ALBERT S. BICKMORE, WHO HAS DEVOTED THIRTY-SIX YEARS TO EDUCATIONAL WORK FOR THE AMERICAN MUSEUM

By George H. Sherwood

ONE of the most valuable and important acquisitions that the Museum has recently received is the personal library and superb collection of lantern slides of Professor Albert S. Bickmore, the organizer and first Curator of the Department of Public Education. These are presented jointly by Professor Bickmore and his wife, Charlotte B. Bickmore. The collection comprises more than twenty thousand lantern slides of which more than twelve thousand are colored. They were acquired by Professor Bickmore during his connection with the State Department of Education and represent the results of his extensive travels. In view of the loss, in the disastrous capitol fire at Albany last winter, not only of the original negatives but also of the supply of lantern slides owned by the State, this collection of slides, which has now no duplicate, is become greatly increased in value.

For many years Professor Bickmore gave at the American Museum lectures to the school teachers of the city and his office was always a rendezvous for teachers, where they were at liberty to consult his library and study the slides at their leisure. More recently his slides have been extensively used in lectures to school children, which have annually been given at the Museum for the purpose of supplementing the class room work in geography and history, and now that the whole series of slides has been made available, these lectures will be unusually instructive and broad in scope.



Mangbetu archers as arranged during a sham battle



After a sham battle. Okondo the King in the center with the light-colored shield



NEWS OF THE CONGO EXPEDITION

From the report of Herbert Lang, Leader

THE Congo Expedition has been unusually successful in its work among the Mangbetu and has emphasized considerably thereby its record in anthropology.

The Mangbetu possess intelligence unwonted among Africans and the Mangbetu monarchy, first described in 1870, is very ancient, probably founded several hundred years ago by Hamitic wanderers from the Nile. Industry has flourished in this monarchy, the Mangbetu excelling in pottery, carving and boat building, while according to some authorities their houses are superior to all others in Central Africa.

Okondo, the present king, has extended very great favor to the Museum's expedition and has arranged many palavers, dances, sham battles and other performances for its study. He has granted that photographs be taken of the King's village of one hundred huts, each with its paintings and carvings, of his own "big hut," and also of his three queens, in whose royal dress figure rare okapi belts, many ornaments of brass, and elaborate headdresses decorated with monkey bones.

The collection in anthropology now consists of some 1400 articles and in the words of Mr. Lang, "... is unique not only on account of its numbers but especially by reason of the selection that has been made throughout practically the entire territory inhabited by the Mangbetu and tribes intimately mingled with them."

The expedition has visited Doagu, Faradje and Aba, traveling with a caravan of one hundred and eighty men, which fact in itself explains the large size of the collections. In the report 2400 mammals are listed, 1000 reptiles and 2850 birds. Among the mammals is a fine bull white rhinoceros, two elephants, a bull black rhinoceros and two buffaloes.

THE MAKING OF POTTERY AT SAN ILDEFONSO

By Herbert J. Spinden

THE Pueblo Indians of New Mexico and Arizona have been subjected almost constantly to strong European influence since the memorable expedition of Coronado in 1540, yet they probably retain a larger proportion of purely native habits of life than any other group of Indians in the United States. To be sure their numbers have dwindled pitifully. Only a few of the prosperous villages that the Spanish explorers found in the valley of the Rio Grande and elsewhere in the Southwest have survived till our time. But their great communal dwellings, their dress, and their household arts are still distinctive. Among the western members the ancient religion and social organization still hold sway as may be seen by the famous Snake Dance of the Moki, and in the valley of the Rio Grande many old time religious and social customs exist under a thin veneer of

Christianity. Needless to say, however, the commercializing American contact is rapidly destroying the remains of the native culture.

The pueblo of San Ildefonso is beautifully situated on the east bank of the Rio Grande about twenty miles northwest of Santa Fe. To the east rise the lofty peaks that mark the southern termination of the Sangre de Cristo Range, while on the opposite side are seen the timbered heights of the Jemez Mountains. The foothills on either hand present arid stretches of reddish soil tufted with dwarfed cedar and other desert shrubs. The river, bordered by cottonwood



Ceremonial bowl, used to hold sacred meal. On the inside, under the terraced rim, are two water snakes above domed clouds from which descends a stream of water upon terraced mountains. At either side are great horned snakes upon a starry field. The bottom of the bowl represents a circular valley surrounded by mountains from which issue streams. In the valley is a lake, abounding with ducks. Similar figures are shown on the outside of the bowl. Other ceremonial bowls frequently show the sacred chiffonetti dancers and miraculous animals such as the bear and mountain lion.



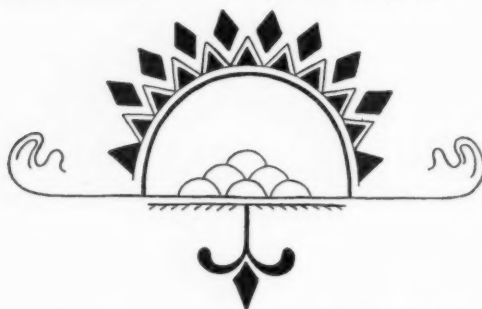
Black and white storage jar made by Indians of San Ildefonso, New Mexico. The decoration differs on all four sides, and consists of rainbows, rainstorms and vegetation.



Black and white storage jar. At the right, jagged lightning; at the left, a terraced cloud (placed on edge with the top projecting inward) swollen with rain as indicated by the crossed lines



Even small geometric motives have a realistic interpretation as well as a descriptive term: 1 — rafters, or sloping lines; 2 — slings or diamonds; 3 — little clouds or scallops; 4 — little hills or sharp points



Symbolic of the rainbow. Upper diamonds are scattering rain clouds; below, the cloud rack with rainbow more or less broken and fringed with light; under the rainbow the open sky, a mass of white cumulus clouds appearing above the horizon which runs out at either end into mysterious distance. Lower horizontal line the level ground, under it roots benefited by the down-pour; from center of ground-line springs a flower, sequel of the rain



Swampy margin of a lake. In diamonded area white represents water, black land. Border of the lake at either side in the form of the ever-recurring terrace or zigzag with its mysterious suggestion of clouds, mountains and human aspiration. At the top the cat-tail rush with long roots growing downward into the deep water

trees, spreads out in a maze of channels. Between it and the town are the cornfields divided irregularly by hedges of wild plums and sunflowers that follow the courses of the irrigation ditches. To the north is seen the Black Mesa, an isolated flat-topped hill perhaps six hundred feet in height that stands in the middle of the valley. The vertical escarpments of black lava resemble the bastions of a fort. On the summit of this hill the natives of San Ildefonso maintained themselves against the besieging Spanish soldiers during the rebellion of 1680.

Several kinds of pottery are still manufactured at San Ildefonso. In particular the pueblo is famous for water jars and large storage vessels with conventionalized designs in red and black upon a cream-colored base. Red base pottery with designs in black, polished black pottery and rough cooking ware are also made.

The processes of pottery manufacture are about the same in all the Rio Grande pueblos but the materials, such as clays and paints, vary from village to village, as do also the styles of decoration. The typical wares of each pueblo are, as a rule, easily recognized. The vessels are built up by hand from hollowed out lumps of



San Ildefonso water jars. The design on the jar at the left shows a spring set in a valley between hills. In the centre is the water dotted with floating duckweed. On all sides are flowering water plants

The second vessel gives to the Pueblo a picture of summer time. White fleecy clouds that float high in the sky are about the neck of the jar; beneath are rain clouds heavy with water, and lower still are blossoming wako plants and humming birds are hovering about



At the left a fine San Ildefonso bowl decorated with red and black designs representing highly conventionalized flowers

The water jar at the right is decorated with floral patterns executed in more realistic manner

clay to which rings of fresh clay are added as the height is increased. The shaping is done by the fingers, which must be dipped frequently in water during the process. The walls of the pots are made thin and even by gourd scrapers. After the pots are dry their outer surfaces are polished with smooth stones, then a sizing of fine clay is added and the process of polishing repeated. After this the designs are painted on with a brush made from a yucca leaf. The kiln is constructed in the open air. A fire is laid and over it the pots are piled in inverted positions, the rims resting on stones or on lumps of clay. More fuel, consisting of slabs of dry manure, is then arranged around the jars, great care being taken to see that none of the fuel actually touches the sides of the vessels. The draft must be kept open or the ware will be blackened. All painted pottery and all polished red pottery is burned in an open draft fire. In the case of the polished black pottery however, after the open fire has been started, it is smothered by several shovelfuls of fine dust-like manure that drives in the smoke and blackens the red wash or sizing. It is hard to realize that the sole difference between the brilliant red ware and the gleaming black is merely a trick in burning.

At San Ildefonso the finest pottery has designs in black on a whitish background. The black paint is made by boiling down the leaves and stems of the wako weed or Rocky Mountain bee balm. This makes a dark brown syrup which becomes a very smooth jet black after burning. Red ochre is commonly used for red paint, while orange paint appears very rarely on San Ildefonso pottery.

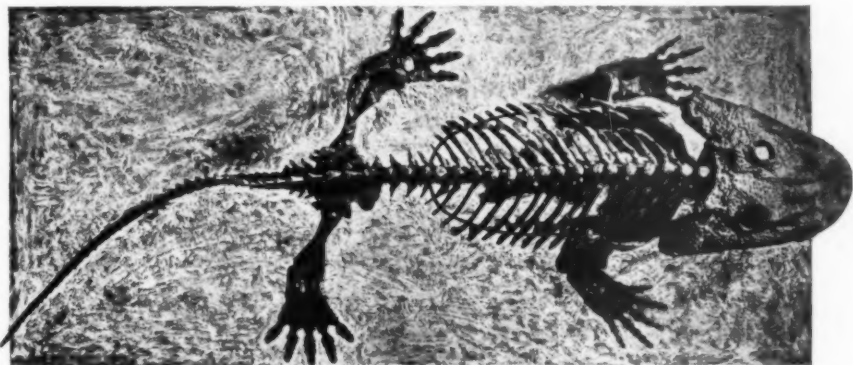
Most of the designs on Pueblo pottery seem quite unintelligible to us, yet to the makers they signify definite and important things. The Pueblo Indians of San Ildefonso, and of the Southwest in general, have a keen appreciation of nature which shows in every feature of their decorative art. Living an agricultural life in a semi-arid environment, rain is to them the great necessity of existence. Clouds, falling rain, flashing lightning, brimming rivers and flooded fields — these are the aspects of nature that please them most. The formal figures in which they embody their conceptions of propitious nature are intended to appeal to the imagination and to please the eye. These figures are manipulated as motives of pure design without losing a bit of their realistic intention. There is also a religious significance in many of the figures painted on the pottery. Primitive people very often represent by means of drawings or dramas what they consider to be desirable things so that they will be more certain to occur. Even the small geometric motives used in narrow bands have a realistic interpretation, although there is usually a descriptive term as well, while the more elaborate designs often disclose strikingly realistic conceptions notwithstanding the formal presentation.

THE AMPHIBIANS OF THE GREAT COAL SWAMPS

By W. D. Matthew

The kind of animals that inhabited the ancient forest-swamps where the great coal formations of the world were laid down is shown by the skeleton of the primitive amphibian *Eryops*, now on exhibition in the Hall of Fossil Reptiles.

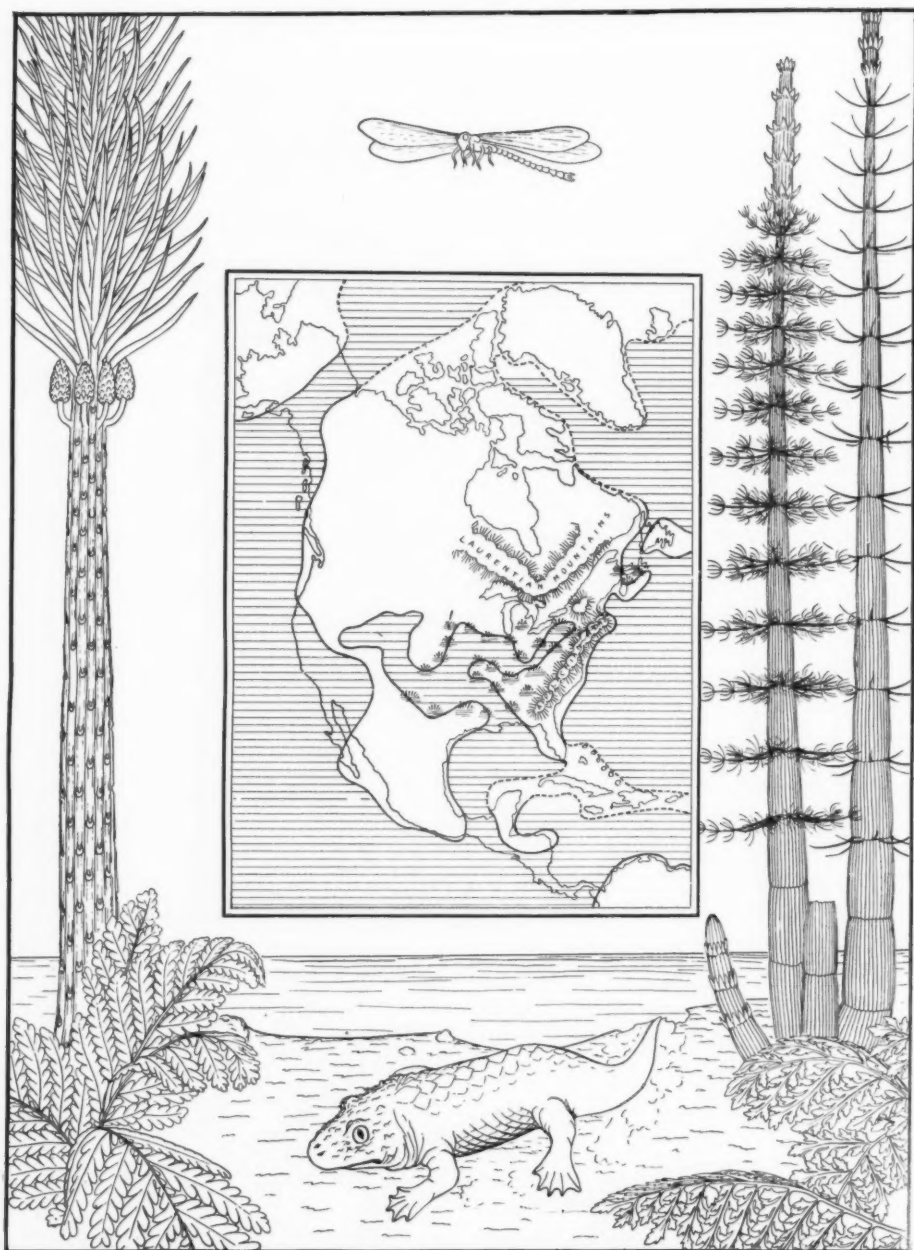
THE Coal Era has more practical importance to civilized man than any other period of the past. Coal is the most important mineral product of the world; to a very considerable extent it may be said to be the material basis of our present-day civilization. If for no other reason than this, the Carboniferous Period, when most of the world's coal beds were being formed, ought to be of especial interest to everyone. But



Eryops from the Lower Permian of Texas. An ancient amphibian which lived about the close of the Coal Era, many million years ago. It is twice as old as the *Brontosaurus*, five times as old as the *Eohippus*, a hundred times as old as the mammoth or mastodon or the earliest known remains of man

to all who are likewise interested in the past history of the earth, in the extinct races of animals and plants which have formerly inhabited it, in the evolution of those which now exist, the Coal Era has a broader interest. For the antique world of this remote period, many millions of years ago, was widely different in its appearance, in the outlines of its continents, in the character of its plants and animals, from the present day. There were no broad-leaved trees nor flowering plants, no birds nor mammals nor any of the higher kinds of insects. The swamp vegetation was chiefly ferns and fern-like plants and giant relatives of the modern equisetums and club mosses, while coniferous trees grew in the uplands. The insects were all of the lower orders, dragon flies, cockroaches, millipedes, and others; no bees, no ants, no butterflies nor beetles.

The land vertebrates were, at this ancient period, in the early stages of their adaptation to terrestrial life. Like the modern efts and salamanders



NORTH AMERICAN GEOGRAPHY AT CLOSE OF COAL ERA

The outlines of land and water are slightly modified from the map by Professor Schuchert. The border shows characteristic vegetation of that epoch, partly conventionalized; to the left, *Sigillaria*, *Neuropteris*, to right *Calamites*, *Sphenopteris*. Below is a sketch restoration of *Eryops*, and above, one of the giant "dragon flies," *Meganeura*.

"The dragon fly that darted over the head of the slow-crawling *Eryops* might seem, except in size... a far more promising candidate for the position of ancestor to the intelligent life which was to appear in the dim future."

they were amphibious animals, half reptile, half fish, in appearance and habits.

Living amphibia are the survivors more or less altered of the kind of animal which in the Coal Era was the highest form of animal life. The study of the structure and development of the higher vertebrates — of reptiles, birds and mammals — has shown that they must be derived from animals of this type, and the successive stages in their evolution are illustrated by the fossil vertebrates of the successive periods of geological history. In the Carboniferous the amphibians were the dominant type, and the reptiles were just beginning to evolve from them, becoming adapted to a more strictly terrestrial life. These earliest reptiles are very close to the primitive amphibians, and the wide gap that now separates these two classes of vertebrates was then so slight that it is difficult to draw any separating line between them.

Most of the primitive amphibians are so small and their skeletons so crushed and imperfect that they cannot very easily be studied except by specialists. A few of them however, the giants of their day, are of fairly large size, and well preserved skeletons have been found in the "red beds" which immediately overlie the coal formation of Texas and are of somewhat later age (Lower Permian) than the true coal measures. *Eryops* is the largest and best known of these Permian amphibians in America. Its bones have been found in the upper coal measures of Pennsylvania but the best skeletons are from the Texas red beds.

Here then is the type of animal that lorded it over the denizens of the gloomy forests and dark morasses of the Coal Period: a sort of gigantic tadpole or mud puppy, with wide flat head, no neck, a thick heavy body, short legs and paddle-like feet and a heavy flattened tail. While able to crawl clumsily and slowly upon the land, he must have been far more at home in the water, living in the dead pools and backwaters and slow-moving streams that traversed the far extended coast-marshes of the great interior sea to the west of the Appalachian highlands.

That this beast, slow, heavy and clumsy, small brained and low organized, should be one of the highest types of living beings in his time, may help to realize how remote and far away was the era of the Coal Forests. That he is a collateral ancestor of all the higher animals — of reptiles, birds, mammals and of man himself — all evolved through the millions of years which have since elapsed from animals of the same type and grade of organization, may serve at least to raise our respect for the possibilities of development which lay in the primitive amphibia. The giant dragon fly that darted over the head of the slow-crawling *Eryops* might seem, except in size, a far superior type of being, a far more promising candidate for the

position of ancestor to the intelligent life which was to appear in the dim future. But the insect had fulfilled the mechanical possibilities of which his structural organization was capable. The future progress of the insect type was to lie not in the direction of a more perfect mechanism, but in the perfection of the metamorphosis during the growth of the individual and in the establishment of elaborate social organizations and instincts.

The amphibian was but beginning the adaptation of the vertebrate structure to a terrestrial habitat and in his organization lay concealed a potential evolution to a far higher plane of existence than the insect organization has been able to reach. It is not so easy to say just wherein this superiority lay, but probably the possession of an internal instead of an external skeleton was an essential feature of it. The late Professor Shaler¹ has pointed out the advantages of an internal as against an external skeleton in stimulating more intelligent and less blindly instinctive activities in the evolution of animal life. The internal skeleton has also certain marked mechanical advantages in permitting the attainment of a much larger size in the animals possessing it, as may easily be seen by comparing the maximum size attained in one or the other type of organization under the same conditions of life.

**"REVEALING AND CONCEALING COLORATION IN BIRDS
AND MAMMALS" BY THEODORE ROOSEVELT**

THIS book, published by the Museum in August is well worth reading by all interested in the subject of animal coloration. The more than one hundred pages present a critical review of Thayer's *Concealing Coloration in the Animal Kingdom* published in 1910.

Mr. Roosevelt considers the principle of countershading a discovery of real merit as a colorist law but with limited application to birds and mammals as far as concealment is concerned. From his extended experience in the field, he holds that this concealment is due mainly to "cover and habits." With pithy arguments and forceful examples, with now and then an admission that the knowledge is incomplete and a frank, "I do not know," he covers Thayer's points, separating misinterpretations from common-sense facts and deductions. The last sentence of his conclusion summarizes his view:

"As regards the great majority of the species [of birds and mammals], the coloration, whether concealing or not, is of slight importance from the standpoint of jeopardizing or preserving the bird's or mammal's life, compared to its cunning, wariness, ferocity, speed, ability to take advantage of cover and other traits and habits, and compared to the character of its surroundings."

¹ THE INDIVIDUAL: A STUDY OF LIFE AND DEATH. N. S. Shaler. New York: Appletons, 1900.

EXHIBITION OF REPTILES AND AMPHIBIANS

By Bashford Dean

THE Museum collection includes at the present time about two thousand amphibians and five thousand reptiles—not a strong representation as material in great museums goes, but more than a good beginning in the development of a department. Of these specimens hardly more than one per cent are on general view: the bulk of the collection in this as in other fields in the Museum will ever from the limits of space be kept in reserve for purpose of study. None the less there are, all will admit, great possibilities for the development of the popular side of the work of the department: reptiles and amphibians are apt to interest the general visitor, and they are of yeoman's service to the classes of nature study which regularly visit the galleries. Snakes, turtles, salamanders, frogs, crocodiles, lizards, all have their especial niche in non-technical natural history. And it is clear that they should be exhibited in such a way as to attract the visitor's attention to the nature of the various groups—to illustrate the principal kinds, native and foreign, to demonstrate at least the elements of their structures, development, habits, distribution, descent. As a means of teaching attractively the life habits of these creatures, a series of special case-exhibits will be prepared, each illustrating one of the larger groups. These will be brought together after the fashion of the panoramic "habitat" bird group, in a separate gallery, for the present in the southeast tower room on the second story. The Bullfrog Group is the first of this series to be exhibited. It has been prepared under the supervision of Miss Dickerson, and is described in the following paper. Her account however does not tell the reader the discouraging technical difficulties surmounted in the long work of preparation in a little developed field. The present work is an earnest of what can be done to make the remaining groups at once attractive and instructive.



A PORTION OF THE BULLFROG GROUP

Two frogs are engrossed in a chickadee on the birch branch above. The smaller frog seems likely to fall a prey to a black snake ready to strike from the white azalea near

The water of the group is a tightly-stretched transparent sheet of celluloid. The ingredients were mixed at the Museum according to a formula which gives a less brittle product than the commercial celluloid and the sheet was made by flowing this liquid on glass in layers one over the other

SOME METHODS AND RESULTS IN HERPETOLOGY

By Mary Cynthia Dickerson

THE Bullfrog Group, which has been put on exhibition at the Museum in the east tower of the second floor, represents a July scene typical of Southern New England. Knowledge of the bullfrog consists usually in an acquaintance with his sedate appearance on the bank of a pool or with the sonorous sound of his "jug-o-rum" during summer nights. We do not realize that a pond which may chance to be the home of this giant of the frogs of North America is a small world of continual drama with the bullfrog well in the plot.

The group in connection with its descriptive labels attempts to show the general biology of the frog, its swimming, croaking, breathing under water and in air, the manner in which it "lies low" before a near enemy when it cannot escape by leaping, its food habits in connection with small mammals, birds, snakes, fish and turtles, insects and snails. It also shows the metamorphosis from the tadpole.

The Bullfrog Group is novel in that it has a transparent background, curved in panoramic fashion and made of fine and durable linen. This is painted in transparent colors, the high lights on the front, the shadows on the back, in an effort to obtain a realistic woodland scene with shifting light in it and through it as in nature. The light at the back of the canvas has been kept at the minimum and balanced on the canvas in front by a weak indirect light, while a relatively strong direct light has been focused on the foreground as if from the western sky (direction of the observer). It has been hoped to obtain by this lighting some slight illusion and perspective notwithstanding the smallness of the space (8½ ft. by 6 ft.). To help the perspective in a minor degree in addition, there has been resort to vari-



Modeling the Japanese giant salamander (*Megalobatrachus japonicus*) from a living specimen loaned by the New York Zoological Park. Wholly aquatic amphibians are not likely to maintain the shape for casting when removed from the water, and must be given over to the animal sculptor for modeling



A DETAIL OF THE FROG GROUP

Sediment, water weed, pond scum, every item under water was a separate problem. The plants above are in their ecological order from the duckweed and lilies on the surface through the pickerel weeds to the higher alders and willows

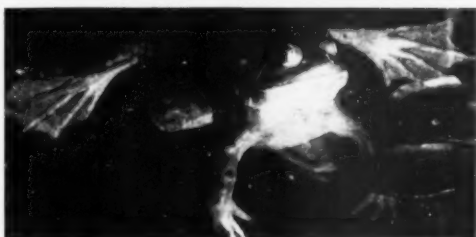
The bullfrog may prove a menace in ponds where any species of food fish is expected to thrive. He usually captures a fish by a single plunge in shallow water using his hands frantically to turn the fish into the right position to swallow

ous small devices: for instance, the foreground slopes upward to meet the background, a total of five inches; tall shrubs at the front are made to lead into ones less tall farther back, large-leaved plants such as alder and birch are in the immediate foreground, willow and other small-leaved plants at the rear, leaves of water lilies and pickerel weed are graded back from larger to smaller; while conspicuous colors, the red of Turk's cap lilies and the white of azaleas, are placed well forward and the purple pickerel weed carries the eye back where the effect of distance and shadow is desired.

The story of the group tells itself at sight: one frog is molting its skin, "swallowing it off" in typical frog fashion; a second is dashing from the water to catch a white-footed mouse descending from a deserted song sparrow's nest; another is croaking, with vocal sacs and throat expanded; a fourth is demonstrating how large a mouthful of young water snakes a bullfrog can master. Still another is making it plain that a frog's tongue is fastened in front and thrown out of the mouth to catch insects. One frog has within his rolled tongue a bumblebee from the white azalea flower. A smaller bullfrog is



A mouthful of young water-snakes



Comfortably floating in the July pond



Catching insects about the azalea flowers



Shedding the skin, "swallowing it off" in frog fashion



AT THE EDGE OF THE JUNGLE

An unexpected meeting between cobra and water monitor; Russell's viper at the right. Cobra and viper are the two snakes used by the snake charmers in India. The water monitor (*Varanus salvator*) is the largest lizard of the world (8 to 9 feet long) and peculiar in having a forked tongue extending from a sheath like a snake's tongue.

Monitor and Cobra mounted by Dwight Franklin. Viper cast in wax and colored by Thomas Bleakney. Plants of India presented for reproduction in wax by the New York Botanical Gardens. Work planned and supervised by M. C. Dickerson.



Modeling the manikin for the water monitor; a living monitor at hand for study of action. Dwight Franklin of the Museum's taxidermy staff made the wax casts for the Bullfrog Group



Coloring from the live frog—which sits placidly at the left—an enlarged model of the frog's mouth for study of structures connected with eating, breathing and croaking. Thomas Bleakney has done some expert color work on many herpetology models and casts. [Model not yet completed for exhibition]



A study from life. Series of wax casts to show the American newt's method of shedding the skin: from the head backward until it binds the fore legs which are drawn out one at a time, on backward until the hind legs must be worked free

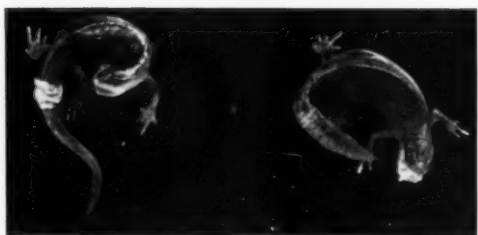
engrossed in a chickadee just alighted on a birch branch above his head, and inattentive to danger, is about to fall a prey to a black snake. A frog far over at the left is "lying low" with head lowered and hands lifted, having unexpectedly found himself in too close proximity to the black snake to make it advisable to leap for safety. Under water one frog in resting position — quite different from the resting position on land — has throat contracted and nostrils closed and like a fish is breathing oxygen from the water, his skin doing the work in place of gills. A swimming frog is sending up a stream of bubbles from the nostrils, showing that the lungs are emptied of air as the skin comes into play for breathing.

At first glance the group presents a small cove reaching into a larger expanse of water, with only four or five frogs in view. The abundance of vegetation and the great array of animal life (there are some half-hundred specimens in the group) have been subordinated to the effect of the whole. All of the animals are directly before the eye yet are so chosen and placed as to be inconspicuous except upon a more careful search, thus imitating the condition in nature.

In addition to the Bullfrog Group there have been put on view recently a Monitor Group and various smaller exhibits. The exhibition of amphibia and reptiles is beset with unusual difficulty and the various species have been represented in museums heretofore by alcoholic material more often than in any other way.



Portion of a wax cast before color is applied. The gills are of glass. Congo eel (*Amphiuma means*) North Carolina; cast from a model from life by Frederick Blaschke



Then the newt reaches back to pull the skin off the tail and swallow it according to the custom of his ancestors

power of accurate seeing. The two especially connected with the completed work are Dwight Franklin and Thomas Bleakney, although results could not have been obtained without the many complex piece molds made by James Bell and without the expert modeling of Frederick Blaschke.

Several methods are in use. If the animal has a thick and horny skin as has the water monitor or a large iguana, the skin itself is mounted over a manikin modeled from life, following the methods of the animal sculptor's work on mammals, or is filled with a soft preparation which hardens later, after it has been modeled into correct form through the skin. The modeling is from life; all work on both form and color is done from the living animal, the New York Zoölogical Park and the New York Aquarium having courteously loaned many duplicate living specimens for study.

If the skin is thin and soft, which is true in most small lizards, many snakes and turtles and all amphibia, the animal is reproduced in wax, the wax used being pure bleached beeswax (which has a high melting point so that summer temperatures are not an enemy to the exhibits) with a small proportion of Canada balsam to make it less brittle and more easily worked. The dead animal may be posed from the living and a waste plaster mold or a piece mold made, from which a cast is taken in wax. This is the method by which the frogs of the Bullfrog Group were made. There are

After much experimental work it has been found possible to make wax reproductions with fidelity to the living animal in form and color and also with lifelike pose and expression. The work has been done by certain artists who have added to the technique of clay, plaster, wax and color, the



European frog (*Rana esculenta*) showing external vocal sacs. When the frog is croaking, these sacs are inflated and collapsed with each emission of sound. Wax cast; eyes and vocal sacs of blown glass. Glass is used also for the vocal sacs of the spring peepers and American toads of the exhibit



SWIMMING SOFT-SHELLED TURTLE (*Trionyx spinifer*)

Most perfect reproductions with all the beauty and softness of color and texture of the living animal can be made in wax to replace the old display of alcoholic material. Posed and cast by Dwight Franklin; colored by Thomas Bleakney. Specimen presented by the New York Aquarium

a few wholly aquatic forms like the hellbender (*Cryptobranchus*) and the Congo eel (*Amphiuma*), which do not maintain the shape for posing when removed from water. These the sculptor must model from the living animal, which model then serves for mold and cast. In the work on snakes



A STUDY FROM LIFE

Wax casts of fighting spotted turtles (*Chelopus guttatus*) made for insertion in a group planned to show local amphibia and reptiles of the month of April

Piece molds by James Bell; casts by Dwight Franklin; color work by Thomas Bleakney



Portion of wax cast of water moccasin (*Ameletodon piscivorus*). Moccasin closely related to the copperhead and one of the most poisonous snakes of the South. The cast is designed for a small Cypress Swamp Group not yet completed. The moccasin unlike a rattlesnake opens the mouth when threatening to strike

the skin is often removed, filled with clay, and modeled into correct form, when it is posed ready for plaster mold and wax cast. In the case of turtles many must be cast entire, the carapace being too soft to make a permanent mount. In other cases the "shell" is used and wax casts of the soft-skinned head and legs are fastened in position, while still others more thick-skinned are mounted as are the thick-skinned lizards.

The advantage of making the casts in wax lies not only in a great susceptibility of this medium to take and retain fine detail, not only in a transparency which adds greatly to the lifelike effect in many amphibia, but also in a surface of such character that it takes oil color with an effect of life texture.

Soft skin texture cannot be gained with a hard plaster surface. When a form is too large to cast in wax, like the giant salamander of Japan, and must be cast in plaster, the plaster surface is afterward sprayed with a coating of wax.

An exhibit of any group of animals to interest other than technical students must be shown from the life standpoint and in relation to man, especially a group repellant because of mystery and myth man has inherited from a time of less knowledge. Amphibia and reptiles should hold a considerable place in the exhibition of a museum for many reasons. They are of great antiquity. The amphibian race bridged the gap in descent between water life and land life, and reptiles, developed from these early amphibians, gave rise through some primitive group to mammals. Thus both are in the direct line of vertebrate evolution.

In the light of this dominant position of the past and the ancestral relation to man, the amphibia and reptiles of to-day take on peculiar interest. Descended from forms of considerable or great size, modern amphibia and reptiles present a race of pygmies, reminiscent of the giants



Mounting the skin of a lizard of Tropical America (*Iguana tuberculata*). The skin, filled with a soft preparation, is tooled into shape from a living model and the preparation within hardens in the permanent form. Mr. Blaschke brings the same skill to reptile taxidermy that he displays in his work on mammals

of millions of years ago in a few forms only, such as the nearly extinct elephant tortoise of a few tropical islands, the leatherback turtle of tropical seas, the gavial of India, the largest modern reptile, and the giant salamander of Japanese streams. Also neither race gives promise of advance for the future. Modern amphibia number only one-eighth of the race of fishes and one-tenth of birds and have taken no step toward freeing themselves from dependence on fresh water, in fact on moisture in a constant supply, and modern reptiles seem not much better placed for the future being fitted for life in equatorial regions only and absolutely dependent on heat for activity. The very high specialization however, which removes from them the chance of advance, gives them unusual value for exhibition in an educational institution like the American Museum. For perhaps in no other vertebrate groups is there more opportunity for the study of remarkable relations to environment including many instances of economic worth and direct relation to agriculture through the destruction of insect and rodent enemies; as also opportunity for the study of examples of structure, embryology and relationship, illuminating as proofs of the important rôles played in the development of intelligent life on the earth.

It would seem fortunate for museum exhibition that some successful methods have been found, and still others are likely to reward research, for reproducing these forms adequately and permanently.

MUSEUM NEWS NOTES

SINCE the last issue of the JOURNAL the following persons have been elected to membership in the Museum:

Patrons, PROFESSOR and MRS. ALBERT S. BICKMORE and MR. CHARLES H. SENFF*;

Life Members, MESSRS. CHARLES L. BERNHEIMER, GEORGE BLEISTEIN, CHESTER L. COLTON, W. BAYARD CUTTING, CHARLES J. EDER and JOHN V. IRWIN;

Sustaining Members, DR. SAMUEL MURTLAND and MRS. ELISABETH C. T. MILLER;

Annual Members, MESSRS. GEORGE L. ADAMS, HENRY SHERMAN ADAMS, JAIME DE ANGULO, JAMES H. S. BATES, GEORGE POWELL BENJAMIN, WILLIAM H. BLISS, SAMUEL J. BLOOMINGDALE, LOUIS BOURY, JULIEN T. DAVIES, JR., MOSES H. GROSSMAN, JOHN KNAPP HOLLINS, FRANK HUGHES, J. HEMSLEY JOHNSON, BENJAMIN G. PASKUS, M. BERNARD PHILIPP, N. TERHUNE, J. C. THAW, C. J. ULMANN, R. WEIL, and CASPAR WHITNEY, MMES. SAMUEL Q. BROWN, WILLIAM KEITH MITTENDORF, and ANNA SHEPARD PIERCE.

ON July 17 the Board of Estimate and Apportionment appropriated \$200,000 for the construction of the foundations of the southeast wing and court building and \$75,000 for furnishing and equipping unfinished portions of the building.

PRESIDENT HENRY FAIRFIELD OSBORN and MR. MADISON GRANT spent the early part of September with Mr. Brown in Alberta. The following is an extract from President Osborn's latest letter:

... Brown and Mr. Grant met me at Red Deer on Monday last, August 28, and we started almost immediately down the river in a small craft loaded to the gunwales. The current, three to five miles an hour, gave us, with Brown sculling and steering at the rear, a three and one-third average speed and we passed all the rapids safely, camping four nights on the shore, prospecting and visiting all important sites and quarries. ... Brown has discovered the only method of working these rich and virgin formations and it looks as though there would be one or perhaps two seasons more. ... The region about here is very rich. Kaison has taken up another Trachodon and parts of two others await removal. Yesterday we secured a fragmentary Albertosaurus skull. All are well and in fine spirits. We start for the remaining 125 miles to-morrow morning. ...

DR. FREDERIC A. LUCAS was appointed Director of the Museum by the Board of Trustees on May 8 and assumed his new office on June 15.

* Deceased.

AMONG the scientific visitors at the Museum this summer were Dr. Friedrich von Huene of Tübingen, and Dr. Franz Schäffer of Vienna. Dr. von Huene remained nearly two months studying the collections of extinct reptiles. Both gentlemen later visited the field parties in Nebraska and Wyoming and various noted fossil localities in the West, and expressed the greatest enthusiasm over the palæontological treasures brought together in this and other American museums, and the wonderful extent and richness of the western fossil fields.

DR. WILLIAM K. GREGORY was appointed Assistant Curator in the Department of Vertebrate Palæontology at a meeting of the Executive Committee in June. Dr. Gregory's *The Orders of Mammals*, published by the Museum in 1910, is a standard book of reference invaluable to teachers and students in the universities of this and other countries. It was on receipt of this volume that Dr. R. Broom, the leading authority on mammal-like fossil reptiles of South Africa, recalling recent work of New York men of science, wrote: "I am afraid New York is taking the place once held by London in the days of Owen, Huxley and Parker and I think it fully deserves to lead."

THE DEPARTMENT OF VERTEBRATE PALEONTOLOGY had three expeditions in the field this summer. The Alberta expedition, in charge of Associate Curator Brown, continued the search for Cretaceous dinosaurs in the rich fossil fields of the Red Deer River. The Wyoming expedition, in charge of Associate Curator Granger, will probably complete this year the exploration of the Big Horn Valley for remains of the earliest ancestors of the horse, and other animals of the Lower Eocene. The third expedition, in charge of Mr. Albert Thomson, has resumed work in the great fossil quarry of Lower Miocene age at Agate, Nebraska.

PROFESSOR BASHFORD DEAN early in July officially represented the American Museum at the Museums Association's meeting at Brighton, England, and in September at the Centennial Celebration of the University of Christiania.

DURING the summer DR. CLARK WISSLER spent some time among the Dakota Indians on the Pine Ridge Reservation, giving especial attention to military and other societies. Other members of the staff of the Department of Anthropology visited various Indian tribes of the United States and Canada continuing their systematic field study of other summers. This work will receive full report later.

THE administrative offices of the Museum have been removed from the east wing and will now be found on the fifth floor near the elevators.

MR. CHARLES L. BERNHEIMER has been made a Life Member in recognition of his contribution for cetacean work in Japan.

MR. CHARLES J. EDER of Palmira has been elected a Life Member because of the courtesies he extended to the Museum's expedition to the United States of Colombia.

MR. V. STEFÁNSSON reports from the Dease River, Arctic America, wonderful success in ethnological work. He has discovered a "new" Eskimo tribe, one that has never seen a white man; he also finds a Scandinavian-like people in Victoria Land. Through the courtesy of the English travelers, Messrs. Melvill and Hornby, who have a boat on Great Bear Lake, the collections will be carried out to Fort Norman and the Mackenzie River. Mr. Stefánsson's letters will be quoted in a later JOURNAL.

THE Museum has in press a *Guide Leaflet* on the methods of making the wax flowers, leaves and fruits on display in the Forestry Hall and used as accessories in habitat groups.

A SERIES of eight lectures on evolution by Professor Henry E. Crampton, formerly delivered as the Hewitt lectures of Columbia University, has been brought out in book form by the Columbia University Press.

PROFESSOR HENRY E. CRAMPTON returned September 19 from a biological expedition to South America and the West Indies. He succeeded in reaching Mount Roraima, at the junction of the Venezuela, Brazilian and Guiana borders. Mr. Roy W. Miner and Dr. Frank E. Lutz were also members of the expedition, the former returning from Dominica in July and the latter from Kaieteur Falls in British Guiana, in August.

DR. LOUIS HUSSAKOF spent several weeks collecting fossil fishes in the Devonian formations of Kentucky and Ohio. Some valuable material was obtained including a number of specimens of the giant *Arthrodira*, *Titanichthys*. The expedition was made possible through the Cleveland H. Dodge Fund.

THE following appointments have been made: Mr. J. B. Foulke, Superintendent of Building; Mr. Harry F. Beers, Assistant Superintendent of Building; Mr. George N. Pindar, Registrar.

MR. HARLAN I. SMITH, Associate Curator in the Department of Anthropology, has resigned his position to accept a curatorship in the new museum at Ottawa.

MR. ROY C. ANDREWS will leave during the last week of November on an expedition to the Orient. He will visit the whaling stations of southern Korea, then outfit at Seoul and travel into the mountains of north Korea, a region unknown zoologically.

THE installation in the new Hall of Minerals is almost completed, and more than three thousand specimens are brought to view. Among recent additions are the remarkable tarbuttite (basic zinc phosphate) associated with vanadinite from Rhodesia, Africa, a beautiful white beryl, enclosing tourmaline, from Pala, California, and important specimens of benitoite and neptunite from the same locality.

THE MUSEUM recently acquired through purchase from Mr. Juan E. Reyna of Ithaca, New York, some interesting fragments of ancient Mexican codices. The fragments were taken from the walls of a church at Tlaquiltenango, Morelos, and are about one hundred in number. They represent parts of several manuscripts on maguey paper and probably date from soon after the arrival of the Spaniards. The church in question was completed in the year 1540. The manuscripts had apparently been collected by the priests and pasted face down on the walls of the cloisters instead of being destroyed outright as was the usual custom. The collection is of peculiar value because the point of origin is so clearly indicated. Tlaquiltenango is situated in the ancient territory of the Tlahuican nation, a branch of the great Nahuatl stock.

DR. J. R. WALKER, United States Indian Physician, of Pine Ridge Reservation, South Dakota, has been a voluntary contributor to the Department of Anthropology for several years. He is especially interested in the mythology and ceremonies of the Dakota Indians, among whom he has lived for thirteen years. During the past year he gathered some four hundred pages of manuscript written by Indians who have learned to write their own language in the Rigg's alphabet. These manuscripts contain unusual material upon the most complex and sacred of Indian conceptions.

DURING the summer Professor C-E. A. Winslow devoted considerable time to the study of an epidemic of a peculiar acute tonsillitis which affected some 1500 persons and caused 50 deaths in the vicinity of Boston and which proved to be due to an infected milk supply. This outbreak of tonsillitis is the first of the kind in this country and the most serious ever recorded anywhere.